


Calais LNG

Calais Maine

Prepared for **Woodard & Curran**
Portland, Maine

Prepared by  **Vanasse Hangen Brustlin, Inc.**
Six Bedford Farms Drive, Suite 607
Bedford, New Hampshire

April 2010

Table of Contents

Wetland Delineation and Assessment.....	1
1.1 Wetland Delineation Methods.....	1
1.2 Wetland Characterizations.....	2
Vernal Pool Survey.....	14
2.1 Vernal Pool Survey Methodology	14
2.2 Vernal Pool Survey Data	16
Wetland Functions and Values	18
3.1 Wetland Function and Values.....	18
3.2 Function and Value Assessment Methods	18
3.3 Wetland Function and Value Data	19

Tables

Table 1	Wetland Characterization Summary
Table 2	Vernal Pool Characteristics
Table 3	Wetland Functions and Values
Table 4	Important Wetland Systems

Appendices

Appendix A	Photographs
Appendix B	List of Preparers
Appendix C	Wetland Data Sheets
Appendix D	Wetland Mapping
Appendix E	Vernal Pool Data Forms
Appendix F	Potential Vernal Pool, Non Vernal Pool, and Disturbed Vernal Pool Data

1

Wetland Delineation and Assessment

The purpose of this document is to provide supplemental information to the Calais LNG Project Resource Report 2 regarding the characteristics and functions of freshwater wetlands found within the project limits. This report is intended to be used in conjunction with Resource Report 2 and includes additional details regarding the natural resource features of each wetland type, descriptions of vernal pools, identification of important wetlands, representative photographs, and US Army Corps of Engineers wetland delineation data forms. This information will be used for local, state, and federal wetland impact permitting.

1.1 Wetland Delineation Methods

For regulatory purposes, wetlands are defined as:

“Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” (Federal Register, 1982)

Field delineation of wetlands for the Calais LNG project was completed by VHB wetland scientists during the late spring and summer of 2008 and during the spring of 2009, utilizing the *Corps of Engineers Wetlands Delineation Manual* (COE, 1987). Except in special circumstances, these criteria require the presence of soil, vegetation, and hydrological wetland indicators for an area to be considered a wetland. Additional supporting publications used in this investigation included: *Field Indicators for Identifying Hydric Soils in New England, Version 3*, (New England Interstate Water Pollution Control Commission, 2004) and the *National List of Plant Species that Occur in Wetlands* (Reed, 1988). Plant species taxonomy throughout this document follows *Flora of the Northeast: A Manual of the Vascular Flora of New England and Adjacent New York* (Magee and Ahles, 1999).



The scope of the wetland delineation included the 128-acre Terminal Site, a 150-foot wide corridor along the “Preferred Pipeline Route” and “Minor Alternatives”, a 50-foot wide corridor along existing unimproved access roads, Additional Temporary Work Spaces (ATWS) and areas for the Horizontal Directional Drilling (HDD). Wetlands boundaries were field located using GPS equipment capable of sub-meter accuracy when differentially corrected. The field delineated wetlands and classifications are presented in Resource Report 2, Appendix 2-O.

Once identified, wetlands were classified according to the National Wetland Inventory (NWI) system outlined in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.* 1979), a broad hierarchical system based on hydrology, physiography, and dominant vegetative forms. As part of a more detailed characterization, the delineated wetlands were then classified based on plant community composition as outlined in the Maine Natural Areas Program (MNAP) document: *Natural Landscapes of Maine* (Gawler and Cutko, Draft 2004). This level of classification groups wetlands with similar vegetation, soils, and hydrology, and is useful in determining the most sensitive wetland areas and assessing impacts at the community level. A summary of the characteristics associated with each community type found within the project is outlined below. Representative photographs of each type are presented in **Appendix A**.

The primary staff persons responsible for the field work and subsequent analysis are listed in **Appendix B**.

Documentation of representative wetland delineations was made using US Army Corps of Engineers Wetland Delineation Data Forms. These forms document detailed information regarding vegetation, soils, and hydrology at specific points along representative wetland delineations. These data forms are included in **Appendix C**. Maps showing each wetland, including their MNAP classification, are included in **Appendix D**.

Where landowner access was granted, field wetland delineations were conducted on approximately 94% of the Preferred Pipeline Route. For parcels where landowner permission was not granted, wetland boundaries were interpolated and digitized into GIS database using low altitude digital orthophotography and associated stereo pairs (flown April 2008) as references.

1.2 Wetland Characterizations

A summary of the characteristics associated with each MNAP wetland community type found within the project limits is outlined below, including a list of wetland systems and the general locations where each is found. **Appendix D** contains mapping of wetlands for the entire Pipeline Route and Terminal Site. Typical soils information associated with each community is based on a combination of field



observations and NRCS mapped soil types. Representative photographs are presented in **Appendix A**. A discussion of vernal pool occurrences is given for each community type, but it should be noted that wetland community types were only classified within the 150 foot wetland delineation corridor. Thus, although vernal pools were surveyed within a 575-foot corridor, only those within the 150-ft corridor have been associated with an MNAP wetland community classification.

1.2.1 Spruce-Fir-Cinnamon Fern Forest

NWI Classification

Palustrine Forested Needle-Leaved Evergreen (PFO4)

General Description

Spruce-Fir-Cinnamon Fern Forests were typically found on poorly drained mineral soils on gently rolling terrain and depressions interspersed within evergreen upland forests. Red Maple-Sensitive Fern Swamps and small Northern White Cedar Swamps are vegetatively similar; however, spruce and fir are more dominant in the overstory with red maple and northern white cedar often as subdominants.

Spruce-Fir-Cinnamon Fern Forests are the most common wetland cover type within the Pipeline corridor, representing approximately 34% of wetlands in the Project area. This wetland community type is distributed throughout the length of the proposed pipeline, and is one of the largest wetland types on the Terminal Site.

Typical Vegetation

Trees: balsam fir (*Abies balsamea*), red spruce (*Picea rubens*), northern white cedar (*Thuja occidentalis*), red maple (*Acer rubrum*)

Shrubs: meadow-sweet (*Spiraea alba* var. *latifolia*), speckled alder (*Alnus incana* ssp. *rugosa*), highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), wild raisin (*Viburnum nudum* var. *cassinoides*)

Herbaceous: sphagnum moss (*Sphagnum* spp.), interrupted fern (*Osmunda claytoniana*), dwarf blackberry (*Rubus pubescens*), three-seeded sedge (*Carex trisperma*), Canadian bunchberry (*Cornus canadensis*), fowl meadow grass (*Glyceria striata*), cinnamon fern (*Osmunda cinnamomea*), lady fern (*Athyrium filix-femina*)

Typical Soils and Hydrology

- Poorly drained marine silts and clays (Scantic)
- Poorly drained coarse loamy lodgment till: (Brayton, Monarda)
- Poorly drained meltout till with shallow bedrock (Naskeag)
- Very poorly drained marine silts and clays: (Biddeford)



Vernal Pools

Spruce-Fir-Cinnamon Fern Forest is the most common cover type associated with the vernal pools documented in this project. Seven pools within the 150-foot Pipeline corridor were found to be within the Spruce-Fir-Cinnamon Fern Forest communities. Some of these vernal pools were of natural origin, while others were naturalized manmade pools, such as skidder scrapes, swales, and quarry excavations.

A single vernal pool located on the Terminal Site was noted within the Spruce-Fir-Cinnamon Fern Forest cover type, as well as two vernal pools found along unpaved access roads. No vernal pools were noted within Spruce-Fir-Cinnamon Fern Forest in staging areas.

1.2.2 Northern White Cedar Swamp

NWI Classification

Palustrine Forested Needle-Leaved Evergreen (PFO4)

General Description

Northern White Cedar Swamps are dense forested wetlands that are located within large basins, typically on very poorly drained organic soils. Northern Cedar-Spruce Seepage Forests are similar, but have mineral soils, instead of organics or peat, and support different mosses.

Only two Northern White Cedar Swamps are located within the pipeline construction corridor and are confined to the eastern end of the Project. There are no Northern White Cedar Swamps located within the Terminal Site. Northern White Cedar Swamps comprise approximately 0.8% of the wetlands in the Project area.

Typical Vegetation

Trees: northern white cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*), red spruce (*Picea rubens*)

Shrubs: common winterberry (*Ilex verticillata*)

Herbaceous: sedges (*Carex* sp.), interrupted fern (*Osmunda claytoniana*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), tussock sedge (*Carex stricta*), sphagnum moss (*Sphagnum* spp.), dwarf blackberry (*Rubus pubescens*)

Typical Soils and Hydrology

- Poorly drained meltout till with shallow bedrock (Naskeag)
- Very poorly drained organic soils: (Bucksport, Wonsqueak)



Vernal Pools

No vernal pools within this MNAP wetland cover type were found within the Terminal Site, ATWS areas, or within the 150-foot cover types mapping corridor along the Preferred Pipeline Route.

1.2.3 Cedar-Spruce Seepage Forest

NWI Classification

Palustrine Forested Needle-Leaved Evergreen (PFO4)

General Description

Cedar-Spruce Seepage Forests are dense canopy forested wetlands that were found on gentle slopes or at the base of slopes with groundwater seepage discharges. It is similar to a Northern White Cedar Swamp, but has a less homogeneous composition and was found on poorly drained mineral soils instead of very poorly drained organic soils.

Cedar-Spruce Seepage Forests are relatively uncommon in the Project area, comprising approximately 3% of the delineated wetlands. There are six occurrences of this wetland type that fall within the Pipeline construction corridor. There is one occurrence of this wetland type within the ATWS. There are no Cedar-Spruce Seepage Forests located on the Terminal Site.

Typical Vegetation

Trees: northern white cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*), red spruce (*Picea rubens*)

Shrubs: speckled alder (*Alnus incana* ssp. *rugosa*), common winterberry (*Ilex verticillata*)

Herbaceous: dwarf blackberry (*Rubus pubescens*), sedges (*Carex* sp.), cinnamon fern (*Osmunda cinnamomea*), three-seeded sedge (*Carex trisperma*), interrupted fern (*Osmunda claytoniana*), tussock sedge (*Carex stricta*), royal fern (*Osmunda regalis*), sphagnum moss (*Sphagnum* spp.)

Typical Soils and Hydrology

- Poorly drained meltout till with shallow bedrock (Naskeag)

Vernal Pools

Two vernal pools were found within the Cedar-Spruce Seepage Forests along the Preferred Pipeline Route. Both of these pools were naturalized pools in historically



disturbed areas, such as skidder scrapes, swales and excavations associated with timber harvesting activities.

1.2.4 Red Maple-Sensitive Fern Swamp

NWI Classification

Palustrine, Forested, Broad-Leaved Deciduous (PFO1)

General Description

Red Maple-Sensitive Fern Swamps were found to vary in canopy density with thinner densities on wetter soils. These systems typically have a patchy shrub layer and full groundcover of herbaceous vegetation, and are found on poorly drained mineral soils in gently sloping areas or in small basins on gentle slopes.

Red Maple-Sensitive Fern Swamps are among the most common forested wetland type within the project limits. Twenty-one occurrences of these wetland systems are widely distributed throughout the Pipeline construction corridor, comprising approximately 8.9% of the delineated wetlands within the Project Area. One occurrence of this wetland type occurs within the HDD areas. There are two occurrences of this wetland type within the ATWS areas. There are no Red Maple-Sensitive Fern Swamps located on the Terminal Site.

Typical Vegetation

Trees: red maple (*Acer rubrum*), balsam fir (*Abies balsamea*), gray birch (*Betula populifolia*), northern white cedar (*Thuja occidentalis*), red spruce (*Picea rubens*), green ash (*Fraxinus pennsylvanica*)

Shrubs: common winterberry (*Ilex verticillata*), arrow-wood (*Viburnum dentatum*), speckled alder (*Alnus incana* ssp. *rugosa*), pussy willow (*Salix discolor*), highbush blueberry (*Vaccinium corymbosum*), meadow-sweet (*Spiraea alba* var. *latifolia*)

Herbaceous: sensitive fern (*Onoclea sensibilis*), jewelweed (*Impatiens capensis*), cinnamon fern (*Osmunda cinnamomea*), sphagnum mosses (*Sphagnum* spp.), dwarf blackberry (*Rubus pubescens*), lady fern (*Athyrium filix-femina*), royal fern (*Osmunda regalis*), sedges (*Carex* spp.), Canada bunchberry (*Cornus canadensis*)

Typical Soils and Hydrology

- Poorly drained marine silts and clays (Scantic)
- Poorly drained coarse loamy lodgment till: (Brayton; Monarda)
- Poorly drained meltout till with shallow bedrock (Naskeag)
- Very poorly drained marine silts and clays: (Biddeford)
- Very poorly drained organic soils: (Bucksport, Wonsqueak)



Vernal Pools

One vernal pool within the 150-foot Pipeline corridor was found to be within the Red Maple-Sensitive Fern Swamp community type. This vernal pool was likely of natural origin, and not associated with recent or historic disturbance.

1.2.5 Alder Shrub Thicket

NWI Classification

Palustrine, Scrub-shrub, Broad-Leaved Deciduous (PSS1)

General Description

Alder Shrub Thickets are distinguished as dense, speckled alder-dominated shrub stands. The herbaceous layer is well developed with mixed graminoid and fern vegetation. Scattered trees may be sparsely interspersed among the shrub layer and often consist of red maple, gray birch, or balsam fir. These wetland systems are often temporarily inundated.

Alder Shrub Thickets are widely found throughout the Pipeline Route, often in small, dense stands. These wetlands most often occur in seasonally flooded fringe habitats bordering forested and emergent wetlands, and are the most common shrub community found within the project area. Sixteen wetland systems within the proposed pipeline corridor are classified as Alder Shrub Thicket, comprising approximately 8% of the wetlands impacted by the pipeline.

Within the Terminal Site there are two occurrences of Alder Shrub Thicket wetlands. It occurs adjacent to the emergent wetlands along the shore of the farm pond on the eastern side of the site. These scrub-shrub wetlands follow in a narrow riparian zone along the defined channel, just upstream of the inlet. Surrounding uplands include spruce-fir forest to the west and mowed grassland to the east. There are three occurrences of Alder Shrub Thicket in the ATWS areas and one occurrence in the Contractor Yard.

Typical Vegetation

Trees: none

Shrubs: speckled alder (*Alnus incana* ssp. *rugosa*), meadow-sweet (*Spiraea alba* var. *latifolia*), gray birch (*Betula populifolia*), red maple (*Acer rubrum*), Balsam fir (*Abies balsamea*)

Herbaceous: sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), rattlesnake grass (*Glyceria canadensis*), sphagnum moss (*Sphagnum* spp.), soft rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*), royal fern (*Osmunda regalis*), dark green bulrush (*Scirpus atrovirens*), interrupted fern (*Osmunda claytoniana*), jewelweed



(*Impatiens capensis*), rough-leaf goldenrod (*Solidago patula*), bluejoint grass (*Calamagrostis canadensis*), wood horsetail (*Equisetum sylvanicum*), pointed broom sedge (*Carex scoparia*), bearded sedge (*Carex comosa*), sallow sedge (*Carex lurida*), dwarf blackberry (*Rubus pubescens*), giant goldenrod (*Solidago gigantea*)

Typical Soils and Hydrology

- Poorly drained marine silts and clays (Scantic)
- Very poorly drained marine silts and clays: (Biddeford)
- Very poorly drained organic soils: (Bucksport, Wonsqueak)

Vernal Pools

Alder Shrub Thicket is the most common shrub wetland cover type associated with the vernal pools documented for this project. One confirmed vernal pool within the 150-foot Pipeline corridor was found to within an Alder Shrub Thicket. This vernal pool is likely of natural origin, and not associated with recent or historic disturbance, such as skidder scrapes, swales and excavations. No vernal pools were located on the Terminal Site within the Alder Shrub Thicket cover type; however, one vernal pool each was found to coincide with an unpaved access road and with an ATWS area.

1.2.6 Leatherleaf Boggy Fen

NWI Classification

Palustrine, Scrub-shrub, Broad-Leaved Deciduous (PSS1)

General Description

Leatherleaf Boggy Fens are peatlands characterized by dense dwarf shrub cover. Leatherleaf and other low ericaceous shrubs are the dominant vegetation. These wetland systems occur in areas where groundwater remains at the surface. These communities typically have a very low pH and support bog vegetation.

A single occurrence of a Leatherleaf Boggy Fen is found within the project area. It is located approximately seven miles from the eastern end of the pipeline and would not be impacted by the project. There are no occurrences of Leatherleaf Boggy Fens within the Terminal Site.

Typical Vegetation

Trees: none

Shrubs: leatherleaf (*Chamaedaphne calyculata*), Greenland Labrador tea (*Ledum groenlandicum*), sheep-laurel (*Kalmia angustifolia*), white pine saplings (*Pinus strobus*), gray birch saplings (*Betula populifolia*), mountain holly (*Nemopanthus mucronata*)



Herbaceous: Sphagnum moss (*Sphagnum* spp.), sedges (*Carex* spp.), beaked sedge (*Carex rostrata*)

Typical Soils and Hydrology

- Very poorly drained organic soils: (Bucksport)

Vernal Pools

No vernal pools were found within the 150-foot corridor having this MNAP wetland cover type.

1.2.7 Bluejoint Meadow: Wet Meadow

NWI Classification

Palustrine, Emergent, Persistent (PEM1)

General Description

Bluejoint Wet Meadows consist of dense vegetation, dominated by bluejoint grass with sparse shrubs and other graminoids. These wetland systems occur in mineral soils in temporarily flooded, flat or slightly sloped riparian areas. The Bluejoint Meadows that are artificially maintained by mowing, haying or clearing in such places as hayfields and utility right-of-ways were designated as “wet meadows”.

Bluejoint Wet Meadows are distributed widely throughout the project area, comprising approximately 14% of Project wetlands. Thirty-two wetland systems classified as Bluejoint Wet Meadow occur within the Pipeline construction corridor. The Terminal Site does not contain any Bluejoint Wet Meadow wetlands. Two occurrences of this wetland type occur in the Contractor Yard and one occurrence of this wetland type was identified within the ATWS areas. These emergent wetlands occur within surrounding upland grasslands in the southwestern portion of the site.

Typical Vegetation

Trees: none

Shrubs: meadow-sweet (*Spiraea alba* var. *latifolia*), speckled alder (*Alnus incana* ssp. *rugosa*), red maple (*Acer rubrum*), gray birch (*Betula populifolia*), pussy willow (*Salix discolor*)

Herbaceous: bluejoint grass (*Calamagrostis canadensis*), red fescue (*Festuca rubra*), red top (*Agrostis gigantea*), meadow foxtail (*Alopecurus pratensis*), sensitive fern (*Onoclea sensibilis*), broom sedge (*Carex scoparia*), dark green bulrush (*Scirpus atrovirens*), rattlesnake grass (*Glyceria canadensis*), woolgrass (*Scirpus cyperinus*)



Typical Soils and Hydrology

- Poorly drained marine silts and clays (Scantic)
- Poorly drained coarse loamy lodgment till: (Brayton, Monarda)
- Very poorly drained marine silts and clays: (Biddeford: SF)
- Very poorly drained organic soils: (Bucksport, Wonsqueak: BW, WF)

Vernal Pools

One confirmed vernal pool within the 150-foot Pipeline corridor was classified as Bluejoint Wet Meadow. This pool was likely of natural origin, and not recently or historically disturbed; however, the surrounding wetland cover type has been mowed, hayed, or otherwise superficially affected by recent and ongoing human management. No vernal pools of this community type were located partly or wholly within the Terminal Site, staging areas or within unpaved access roads.

1.2.8 Bluejoint Meadow: Shallow Marsh

NWI Classification

Palustrine, Emergent, Persistent (PEM1)

General Description

Bluejoint Shallow Marshes consist of dense vegetation, dominated by bluejoint grass with sparse shrubs and other graminoids. These wetland systems typically occur on intermittently flooded very poorly drained soils, often in nearly level riparian areas. The Bluejoint Meadows included within the "Shallow Marsh" designation were distinguished from the wet meadows because woody species in shallow marsh areas are typically limited by hydrology rather than management. These wetland systems have dense, tall vegetation, mainly consisting of grassland species and dominated by bluejoint grass. Mixed Graminoid-Shrub Marshes are similar, but are not strongly dominated by bluejoint grass.

Five shallow marsh wetland systems classified as Bluejoint Meadow occur within the Pipeline construction corridor, comprising approximately 2% of Project wetland types. There are no occurrences of this wetland cover type within the Terminal Site, the Contractor Yard or the ATWS areas.

Typical Vegetation

Trees: none

Shrubs: meadow-sweet (*Spiraea alba* var. *latifolia*), speckled alder (*Alnus incana* ssp. *rugosa*), red maple (*Acer rubrum*), gray birch (*Betula populifolia*), pussy willow (*Salix discolor*)



Herbaceous: bluejoint grass (*Calamagrostis canadensis*), sensitive fern (*Onoclea sensibilis*), broom sedge (*Carex scoparia*), dark green bulrush (*Scirpus atrovirens*), rattlesnake grass (*Glyceria canadensis*), woolgrass (*Scirpus cyperinus*)

Typical Soils and Hydrology

- Very poorly drained marine silts and clays: (Biddeford)
- Very poorly drained organic soils: (Bucksport, Wonsqueak: BW, WF)

Vernal Pools

No vernal pools were found within the 150-foot corridor having this MNAP wetland cover type.

1.2.9 Mixed Graminoid-Shrub Marsh: Shallow Marsh/Wet Meadow

NWI Classification

Palustrine, Emergent, Persistent (PEM1)

General Description

Mixed Graminoid-Shrub Marsh is a broad designation supporting a heterogeneous vegetated community in which various herbaceous graminoids may be present or predominant, depending on the site, without dominance by tussock sedge, bluejoint grass or speckled alder. Shrubs may also be mixed in; however, they would constitute <30% of vegetated cover. These wetland systems occur on occasionally flooded or saturated mineral soils. Bluejoint Meadows and Alder Shrub Thickets within the project area may be similar vegetatively; however, they are strongly dominated by bluejoint grass or speckled alder, respectively.

Mixed Graminoid-Shrub Marsh (shallow marsh/wet meadow) wetlands are widely distributed throughout the project area, comprising approximately 8.5% of Project wetlands. Thirteen shallow marsh/wet meadow wetland systems classified as Mixed Graminoid-Shrub Marsh occur within the Pipeline construction corridor. One small Mixed Graminoid-Shrub Marsh occurs within the Terminal Site adjacent to the farm pond. Two occurrences of this wetland type were identified within the ATWS areas; three occurrences within the Contractor Yard and one occurrence within the HDD-ATWS areas. This emergent cover type fringes the northern bank of the pond and transitions to Alder Shrub Thicket upstream of the inlet. Surrounding uplands are forested to the west, with a spruce-fir vegetated community, and mowed grassland to the east.

Typical Vegetation

Trees: none



Shrubs: meadow-sweet (*Spiraea alba* var. *latifolia*), speckled alder (*Alnus incana* ssp. *rugosa*), common winterberry (*Ilex verticillata*), steplebush (*Spiraea tomentosa*)

Herbaceous: bluejoint grass (*Calamagrostis canadensis*), red raspberry (*Rubus ideaus*), royal fern (*Osmunda regalis*), woolgrass (*Scirpus cyperinus*), rattlesnake grass (*Glyceria canadensis*), sensitive fern (*Onoclea sensibilis*), lady fern (*Athyrium filix-femina*), dwarf blackberry (*Rubus pubescens*), beaked sedge (*Carex rostrata*), Canada bunchberry (*Cornus canadensis*), fringed sedge (*Carex crinita*), giant goldenrod (*Solidago gigantea*), soft rush (*Juncus effusus*), marsh fern (*Thelypteris thelypteroides*), wood horsetail (*Equisetum sylvaticum*), steplebush (*Spiraea tomentosa*), dark green bulrush (*Scirpus atrovirens*), cinnamon fern (*Osmunda cinnamomea*)

Typical Soils and Hydrology

- Poorly drained marine silts and clays (Scantic)
- Poorly drained coarse loamy lodgment till: (Brayton, Monarda)
- Very poorly drained marine silts and clays: (Biddeford)
- Very poorly drained organic soils: (Bucksport, Wonsqueak)

Vernal Pools

One confirmed vernal pool, coinciding with an unpaved access road, was found to occur within a Mixed Graminoid-Shrub Marsh. This vernal pool was likely of natural origin, and not recently or historically disturbed. No vernal pools of this vegetated community were located partly or wholly within the 150-foot Pipeline corridor, Terminal Site or within staging areas.

1.2.10 Mixed Graminoid-Shrub Marsh: Scrub-Shrub

NWI Classification

Palustrine, Scrub-shrub, Broad-Leaved Deciduous (PSS1)

General Description

Mixed Graminoid-Shrub Marsh – Scrub/Shrub is a broad designation supporting a heterogeneous vegetated community in which various wetland shrubs may be present or predominant, depending on the site, without dominance by tussock sedge, bluejoint grass or speckled alder. These wetland systems occur on occasionally flooded or saturated mineral soils. Bluejoint Meadows and Alder Shrub Thickets within the project area may be similar vegetatively; however, they are strongly dominated by bluejoint grass or speckled alder, respectively.

Mixed Graminoid-Shrub Marsh wetlands are common and widely distributed throughout the project area, but are somewhat more concentrated in the western half. Twenty-three scrub-shrub wetland systems classified as Mixed Graminoid-Shrub Marsh occur within the Pipeline construction corridor, comprising 9.8% of Project



wetlands. There are three occurrences of this wetland type within the ATWS areas. There are no occurrences of this vegetated community located within the Terminal Site, the HDD Areas or the Contractor Yard.

Typical Vegetation

Trees: none

Shrubs: meadow-sweet (*Spiraea alba* var. *latifolia*), speckled alder (*Alnus incana* ssp. *rugosa*), common winterberry (*Ilex verticillata*), steplebush (*Spiraea tomentosa*)

Herbaceous: bluejoint grass (*Calamagrostis canadensis*), red raspberry (*Rubus ideaus*), royal fern (*Osmunda regalis*), woolgrass (*Scirpus cyperinus*), rattlesnake grass (*Glyceria canadensis*), sensitive fern (*Onoclea sensibilis*), lady fern (*Athyrium filix-femina*), dwarf blackberry (*Rubus pubescens*), beaked sedge (*Carex rostrata*), Canada bunchberry (*Cornus canadensis*), fringed sedge (*Carex crinita*), giant goldenrod (*Solidago gigantea*), soft rush (*Juncus effusus*), marsh fern (*Thelypteris thelypteroides*), wood horsetail (*Equisetum sylvaticum*), steplebush (*Spiraea tomentosa*), dark green bulrush (*Scirpus atrovirens*), cinnamon fern (*Osmunda cinnamomea*)

Typical Soils and Hydrology

- Poorly drained marine silts and clays (Scantic)
- Poorly drained coarse loamy lodgment till: (Brayton, Monarda)
- Very poorly drained marine silts and clays: (Biddeford)
- Very poorly drained organic soils: (Bucksport, Wonsqueak)

Vernal Pools

One shrub wetland within the 150-foot Pipeline corridor was found within a Mixed Graminoid-Shrub Marsh community type. The pool (VP29) is of natural origin, and not recently or historically disturbed and qualifies as a Significant Vernal Pool by the criteria explained in Chapter 335, Section 9(B). This particular vernal pool is the only Significant Vernal Pool expected to be directly impacted by the project.

2

Vernal Pool Survey

2.1 Vernal Pool Survey Methodology

In Chapter 335, Section 9 of the Maine Natural Resource Protection Act (NRPA) rules, a vernal pool is defined as:

*“A natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubrachipus spp.*), as well as valuable habitat for other plants and wildlife.”*

The Maine Rules go on to distinguish “Significant” vernal pools based on “the number and type of pool-breeding amphibian egg masses in a pool, or the presence of fairy shrimp, or use by threatened or endangered species...” Although excluded from the Maine definition, manmade pools that otherwise meet the above definition are regulated in wetlands at the federal level and were also delineated as vernal pools.

In early spring 2008, field scientists began a survey of vernal pools within 250 feet of the Project, including proposed temporary work spaces, contractor storage yards, and unimproved access roads. The vernal pool survey extended into a second field season in 2009 in order to fully evaluate all potential vernal pools along the pipeline corridor, on the terminal site, and on the proposed mitigation site.

Along the pipeline, vernal pool surveys included a 250 feet on either side of the construction corridor (75 feet wide), for a total corridor study width of 575 feet. Field biologists conducted a comprehensive survey to identify, map, and assess vernal pools within the study area. All vernal pools were field delineated and GPS located.

In addition to documenting vernal pools, three classes of wet depressions that were not true vernal pools were also located. The first of these areas were termed “non-



vernal pools” and included wet depressions that contained vernal pool indicator species, but contained fish, had a permanent inlet or outlet, or were so shallow (< 4 inches) that they were highly unlikely to persist long enough for tadpoles to hatch and develop. The second class of similar wet depressions termed “disturbed” was made up of recent ruts created along power lines, ATV trails, and skidder trails that serve as disturbed low quality breeding areas. A third class termed “potential future pools” included wet depressions that may be utilized as vernal pool habitats at some point in the future because they had ephemeral ponding, but they contained no vernal pool indicator species during the 2008 or 2009 breeding seasons.

Vernal pool survey methods were developed with guidance from Dr. Phillip deMaynadier of the Maine Department of Inland Fisheries and Wildlife (IF&W) and Dr. Aram Calhoun of the University of Maine at Orono in early April 2008.¹ Dr. Calhoun was kept abreast of initial vernal pool activity and timing as the survey unfolded. In addition, the Maine Association of Wetland Scientists web postings of vernal pool activities were closely monitored to assure the appropriate survey windows would be achieved.

The first vernal pool survey site visit was conducted by VHB biologists during the week of April 14, 2008. The multiple purposes of the visit included identifying access points, observing amphibian chorusing and possible egg-laying, as well as performing a general reconnaissance of the Project area. At the time of the initial visit, amphibian observations were challenging due to a remaining two-foot snowpack. Consequently, a second reconnaissance visit was conducted during the week of April 28.

Field observations suggested that severe winter weather during 2008 may have affected the amphibian breeding season, pushing it later than normal. This unusual weather also may be responsible for what was observed to be relatively low wood frog reproduction over a compressed breeding season and relatively high spotted salamander reproduction. For this reason, the recommended survey window, as described in the regulations, required adjustment. The last 2008 field effort for the amphibian survey was April 30 to May 30, 2008. All sites visited prior to May 12 were surveyed a second time for additional salamander egg masses.

Each pool was evaluated for the following criteria:

- Presence of fish and a permanent inlet or outlet. Pools with fish or either a permanent inlet or outlet were excluded as Significant Vernal Pools (NRPA Administrative Rules Chapter 335, Section 9; LD 1952). Pools without fish or a permanent inlet or outlet were considered to be candidate pools for Significant Vernal Pool designation. Beaver impoundments were assumed to support fish.



¹ See Appendix E.



- Number of wood frog egg masses, spotted salamander egg masses, and blue spotted salamander egg masses. Pools with 40 or more wood frog egg masses, at least 20 spotted salamander egg masses, or at least 10 blue spotted salamander egg masses were identified as Significant Vernal Pools (Chapter 335, Section 9).
- Presence of fairly shrimp or rare, threatened, or endangered (RTE) species. Pools with these resources would be identified as Significant Vernal Pools, but no such pools were found in the study area.

Due to the apparently compressed 2008 breeding season, not all pools could be surveyed before wood frog eggs began to hatch.² Pools surveyed following wood frog hatch were evaluated based on egg mass remains as well as wood frog tadpole densities in relation to pool size. Tadpole densities were classified as few, common, or many based on the dip net sampling. Densities in pools with tadpoles present, but infrequently found in dip samples were classified as few. Tadpole densities in pools in which a small number of tadpoles could be obtained in most samples were considered common. Tadpole densities in pools in which many tadpoles could be obtained in most samples were classified as many.

In the spring of 2009 (i.e., April 28th to May 30th), VHB biologists surveyed additional areas where the proposed pipeline corridor route had been modified (by route variation and corridor widening) and to recheck several vernal pools identified in 2008. During the 2009 field work, VHB biologists identified two additional vernal pools along the pipeline. Also, the pipeline route was shifted in various locations to avoid impacts to several vernal pools, some of which were identified as significant. **Table 2** highlights the pools that are no longer within 250' from the existing construction corridor, but have upland habitat (750' buffer) impacted by the project. Additionally, the status of a total of eight vernal pools identified in 2008 was modified based on new data/observations collected in 2009:

- Five (5) of the potential vernal pools identified in 2008 were upgraded to vernal pools in 2009 based on presence of vernal pool indicator species.
- Two (2) of the 2008 vernal pools revisited in 2009 were determined to not meet the criteria for a vernal pool due to their disturbed nature.
- One (1) of the 2008 vernal pools was down-graded to a non-vernal pool as a result of the 2009 field work.

Natural pools with 40 or more wood frog egg masses, or at least 20 spotted salamander egg masses, or at least 10 blue spotted salamander egg masses were identified as Significant Vernal Pools if they were determined to remain full until at



² These pools were re-surveyed in 2009 to ensure that vernal pool classification was based on actual egg mass data rather than tadpole densities.



least July 31 (i.e., pools which were 100 square feet in size and 1 ft deep at the time of survey). The minimum size and water depth considerations were based on observations made in pools prior to the wood frog hatch.

In addition to counting egg masses, pools were sampled for the presence of fairy shrimp. Sampling involved sweeping the water column with dip nets in sunny portions of the pools. The presence of fairy shrimp within a pool and/or observed habitat use by rare, threatened, or endangered species normally associated with vernal pools would also qualify pools of natural origin as Significant Vernal Pools; however, no fairy shrimp or rare species were observed.

2.2 Vernal Pool Survey Data

The following features were GPS located during the 2008 and 2009 surveys: 58 true vernal pools, 20 non-vernal pools that either had predators or were drying out, 46 vehicle ruts with indicator species, and 31 potential future vernal pools that lacked indicator species. The true vernal pools included eight Significant Vernal Pools as well as seven naturalized pools that met all Significant Vernal Pool criteria except that they were manmade. Resource Report 2, Appendix 2-O depicts the locations of the true vernal pools, with 250-foot habitat radii shown around the Significant Vernal Pools. Features associated with these vernal pools are listed in **Table 2**.

3

Wetland Functions and Value

3.1 Wetland Functions and Values

Wetland functions and values were assessed for each wetland system as a way to determine wetland impacts from the Project, as well to determine the most important and sensitive wetlands. This information will be used as the basis for analyzing impact minimization and mitigation options.

3.2 Function and Value Assessment Methods

Wetland functions and values were assessed utilizing *The Highway Methodology Workbook Supplement*, (US Army Corps of Engineers, New England Division, NEDEP-360-1-30a, 1999). This method considers eight functions and five values for the evaluation of wetlands:

- groundwater recharge/ discharge;
- flood flow alteration;
- fish and shellfish habitat;
- sediment/toxicant/pathogen retention, nutrient;
- removal/retention/transformation production export;
- sediment/shoreline stabilization and wildlife habitat;
- recreation;
- educational/scientific value;
- uniqueness/heritage, visual quality/aesthetics;
- threatened or endangered species habitat.

Wetland systems were identified and field assessed for functions and values within the proposed Project between during the summers of 2008 and 2009. Individual wetland impact areas were grouped into wetland systems based on hydrologic connectivity and location within watersheds or subwatersheds. Wetlands split by

manmade features, such as roadways, were considered non-contiguous and were treated as separate systems. Locations of wetland systems within the project area are shown in Resource Report 2, Appendix 2-O.

Each function for each wetland system was assigned a rating of absent (N), present (Y), or principal (P) functions. Principal functions and values represent the most important ecosystem functions and values important to society. Each wetland was assigned at least one principal function, though the importance of principal functions may vary greatly between wetlands. Additional factors considered in the analysis included the wetland size, landscape setting, relationships to surface waters, and wetland types present. Larger wetland systems within the project area may contain several habitat types, and therefore may support a broader range of functions and values. Other wetlands may be limited due to a smaller size or their location adjacent to roadways, developed land or recent disturbance, such as logging or mowing.

3.3 Wetland Function and Value Data

A summary of the 13 functions and values assessed for each wetland system impacted by the proposed Project is given in **Table 3**. Wetlands rated as the most valuable are listed in **Table 4**. In general, the most important wetland systems are closely associated with the St. Croix River, include Significant Wildlife Habitats, or are associated with major streams.

Tables

List of Tables

- Table 1 Wetland Characterization Summary
- Table 2 Vernal Pool Characteristics
- Table 3 Wetland Functions and Values
- Table 4 Important Wetland Systems

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MNAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷
Pipeline	0.2	W-6	512	1.2	0.4	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	
				0.0	0.0	Riverine	R2	Riverine/Stream	Sa
	0.37	W-9-B	117	0.1	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.0	0.0	Bluejoint Meadow	PEM1	Shallow Marsh (PEM1)	
				0.0	0.0	Pond	PUB	Ponds (PUB)	
				0.0	0.0	Riverine	R2	Riverine/Stream	SF
	0.44	W-9-C	111	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	0.48	W-9-D	263	0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	LT, Sa
	0.6	W-9-E	384	0.5	0.2	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	0.8	W-10-A	37	0.9	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	0.83	W-10-B	0	0.1	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	Sa
	0.88	W-10-C	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	0.92	W-10-D	315	0.0	0.0	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	1.05	W-10-E	156	0.6	0.2	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	1.16	W-10-F	149	0.4	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	1.19	W-10-G	0	0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	1.23	W-10-H	87	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	1.36	W-10-I	624	0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	BR, Sa
	1.45	W-11	12	0.1	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	1.72	W-18	963	1.3	0.4	Northern White Cedar Swamp	PFO4	Evergreen Forested Wetland (PFO4)	Sa, SF, WF
				0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	Sa
				0.3	0.1	Northern White Cedar Swamp	PFO4	Evergreen Forested Wetland (PFO4)	
				1.3	0.4	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	
	2.1	W-19	227	0.5	0.2	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Ng, WF
	2.24	W-20	3	0.6	0.2	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	BW
	2.34	W-220	15	0.0	0.0	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	Ng, WF
	2.44	W-21	37	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Wet Meadow (PEM1)	Bn
	2.53	W-22	18	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Bn
	2.61	W-203	0	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Ng
	2.64	W-23	2	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	3.2	W-24-A	6	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Ng
	3.36	W-24-C	106	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	3.43	W-24-D	114	0.4	0.1	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	3.69	W-24-E	201	0.2	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	4.14	W-25	0	0.1	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Bn
				0.4	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
				0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MNAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷
Pipeline	4.64	W-26	1,449	0.7	0.2	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				2.5	0.8	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, Mv
	4.95	W-27	86	0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Mv
	5.04	W-28-A	182	0.5	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	5.07	W-28-B	19	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	5.08	W-28-C	59	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	5.74	W-30	53	0.2	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Bn
	5.87	W-204	0	0.1	0.0	Leatherleaf Boggy Fen	PSS1a	Bog/Fen (PSS1a)	WF
	6.09	W-32	119	0.3	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	Bn
	6.36	W-33-A	35	0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	
				0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	6.39	W-34	40	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	6.52	W-35	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	6.55	W-36	45	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	6.82	W-38	20	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	Bn
	6.86	W-205	52	0.1	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	Sa
	6.96	W-41	35	0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Sa
	7	W-45	48	0.1	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Sa
	7.02	W-44	65	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Sa
	7.08	W-55	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	Sa
	8.69	W-77	166	0.2	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Lm, Lb, WF
	8.73	Stream-5	4	0.0	0.0	Ditch	R2	Ditch	Lm, Lb
	8.93	W-78	180	0.3	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Sa
	8.95	W-80	81	0.2	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Bn
	9.05	W-81	273	0.5	0.2	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Bn, Lm
	9.2	W-83	468	1.1	0.3	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	Sa
	9.26	W-86	14	0.0	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Sa
	9.32	W-88	100	0.1	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Sa
	9.38	W-89-A	140	0.2	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Lm, Sa
	9.46	W-89-B	532	1.0	0.4	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	Ca
	9.64	W-89-C	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	WF
	9.64	W-89-D	586	1.3	0.4	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Ca, Sa
	9.77	W-90-B	23	0.1	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	Sa

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MNAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷
Pipeline	9.79	W-91-A	51	0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	SF
	9.83	W-91-B	167	0.3	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	SF
	9.98	W-301	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	
	10.01	W-302	44	0.1	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Sa
	10.02	W-303	16	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
				0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	10.14	W-93	234	0.1	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	
				0.3	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Ca, Sa
	10.24	W-94	145	0.2	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.2	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	10.4	W-95	219	0.5	0.2	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, Sa
	10.55	W-96	190	0.4	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa, SF
	10.62	W-97	6	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	SF
	10.68	W-98	11	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	SF
	10.82	W-99	0	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.3	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	11	W-100	1,047	0.5	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
				1.5	0.5	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	TuB, Bn, MT, Sa
	11.31	W-100-A	105	0.3	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, WF
	11.45	W-102	184	0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	11.5	W-103	0	0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	Bn
				0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	11.55	W-104	279	0.1	0.0	Riverine	R2	Riverine/Stream	
				0.3	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Lm, Lb, Bn
	11.67	W-107	0	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Sa
				0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	11.7	W-109-A	200	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.3	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Lm, Bn, Sa
	11.8	W-109-B	72	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	11.92	W-117-A	53	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	12.07	W-117-B	113	0.4	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	DH, Sa
	12.24	W-118-A	168	0.3	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.3	0.1	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	Sa, SF

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MNAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷
Pipeline	12.36	W-118-B	223	0.5	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	BR, Sa
	12.5	W-118-C	0	0.2	0.0	Bluejoint Meadow	PEM1	Shallow Marsh (PEM1)	DW
				0.0	0.0	Bluejoint Meadow	PEM1	Shallow Marsh (PEM1)	
	12.75	W-122-A	445	0.2	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.6	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	12.89	W-122-B	103	0.1	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	BR, Sa
	13.15	W-125	56	0.2	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	Bn
	13.35	W-126	3	0.2	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	Bn, DT
	13.93	W-127	1,063	0.8	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				1.4	0.7	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	DM, Mv, MW
	14.28	W-128-A	3	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	Bn
	14.31	W-128-B	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
	14.47	W-129-A	71	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	14.52	W-129-C	68	0.2	0.0	Riverine	R2	Riverine/Stream	W
	14.55	W-129-E	11	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	BR
				0.2	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	14.85	W-130-A	134	0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
				0.2	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	14.88	W-130-B	131	0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	15.01	W-131-A	91	0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	15.01	W-132	0	0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	15.09	W-133-A	0	0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	15.12	W-131-B	0	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	15.12	W-133-B	0	0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	15.15	W-134	0	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	Bn
	15.17	W-131-C	0	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	15.18	W-135	0	0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	15.31	W-136	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	15.36	W-131-E	393	0.5	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
				0.1	0.0		PEM1	Shallow Marsh (PEM1)	
	15.36	W-137-A	196	0.4	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	Sa, LS
	15.42	W-137-B	22	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	15.46	W-138	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MNAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷
Pipeline	15.7	W-139-A	805	0.1	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.5	0.0	Bluejoint Meadow	PEM1	Shallow Marsh (PEM1)	
				0.9	0.1	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	
				0.4	0.2	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	LS, Sa, SF, W
				0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
	16.01	W-141	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	16.3	W-142	144	0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	16.44	W-143	27	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	16.65	W-144	501	0.6	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.7	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Br, DH, Sa
	16.95	W-145	413	0.9	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa
	17.62	W-148-A	174	0.3	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	SF
	17.8	W-149-B	429	0.9	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	SF
	18.17	W-151	70	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	CK, Sa
				0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	18.34	W-152	82	0.1	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
				0.0	0.0	Riverine	R2	Riverine/Stream	SF, W, WF
	18.47	W-153	31	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	DT
	18.55	W-154	577	0.6	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.7	0.4	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Sa, SF
	18.65	W-156	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	Sa
				0.1	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	18.74	W-160	43	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	SF
	18.89	W-162-A	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
				0.2	0.0	Bluejoint Meadow	PEM1	Shallow Marsh (PEM1)	
	19.1	W-162-C	983	0.5	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				1.3	0.6	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, SF
	19.22	W-162-D	93	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.1	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	19.31	W-163-A	507	0.4	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.7	0.3	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, DH
	19.4	W-163-B	0	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	19.47	W-163-C	148	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn
	19.52	W-163-D	67	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
				0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MNAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷	
Pipeline	19.82	W-164	47	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn	
	19.83	W-165	31	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn	
	20.09	W-166	140	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)		
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, Dg	
	20.2	W-167	245	0.2	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)		
				0.3	0.2	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn	
	20.27	W-168-A	68	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn	
	20.35	W-168-B	174	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)		
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Bn, MW	
	20.57	W-169	140	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)		
				0.2	0.1	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	Mv	
	20.6	W-217	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	Mv	
20.61	W-218	24	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	Mv		
	Subtotal:			21,615	13.4					
Terminal Site ⁶	0.00	Stream-1	0	0.1	0.1	Riverine	R2	Riverine/Stream	Ly	
	0.00	W-1-A	0	0.1	0.1	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)		
			0	0.1	0.1	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)		
			0	0.5	0.5	Pond	PUB	Ponds (PUB)		
			0	0.2	0.2	Riverine	R2	Riverine/Stream		
	0.00	W-2	0	1.2	1.2	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	LT, LY	
			0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	SF	
	0.00	W-3-A	0	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	SF	
		Subtotal:			2.1	2.1				
	7.08	W-55	18	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)		
	8.57	W-76	28			Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)		
		Subtotal:			47	0.0				
Contractor Yard	0.00	W-180	0	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)		
	6.88	W-39	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)		
	6.95	W-43	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)		
	7.06	W-56	0	0.0	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)		
						Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)		
	7.07	W-52	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)		
	7.08	W-55	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)		
		Subtotal:			0.3	0.0				

Table 1 Wetland Characterization Summary

Location	MP	Wetland ID	Length of Crossing (ft) ²	Construction Impacts (ac) ³	Operational Impacts (ac) ⁴	MINAP Classifications	NWI Classification ¹	Cover Types	NRCS Mapped Soils ⁷
ATWS	0.01	W-202	0	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	0.37	W-9-B	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	
	1.45	W-11	0	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	6.86	W-205	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
	7	W-45	0	0.0	0.0	Alder Shrub Thicket	PSS1	Scrub-Shrub Wetland (PSS1)	
	9.2	W-83	0	0.2	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
	9.26	W-86	0	0.0	0.0	Red Maple-Sensitive Fern Swamp	PFO1	Deciduous Forested Wetland (PFO1)	
	10.14	W-93	0	0.1	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	
	10.4	W-95	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PFO4	Evergreen Forested Wetland (PFO4)	
	14.47	W-129-A	0	0.1	0.0	Bluejoint Meadow	PEM1	Wet Meadow (PEM1)	
	14.47	w-216	0	0.0	0.0	Cedar-Spruce Seepage Forest	PFO4	Evergreen Forested Wetland (PFO4)	
	15.31	W-136	0	0.0	0.0	Mixed Graminoid-Shrub Marsh	PSS1	Scrub-Shrub Wetland (PSS1)	
	15.36	W-137-A	0	0.1	0.0	Mixed Graminoid-Shrub Marsh	PEM1	Shallow Marsh (PEM1)	
	15.7	W-139-A	0	0.0	0.0	Spruce-Fir-Cinnamon Fern Forest	PSS1	Scrub-Shrub Wetland (PSS1)	
		Subtotal:		0.8	0.0		PFO4	Evergreen Forested Wetland (PFO4)	
Total			21,662	52.0	15.5				

¹ PFO: forested; PSS: scrub-shrub; PEM: emergent; R2: Riverine; PUB: ponded (Cowardin et al. 1979).

² Measured at pipeline centerline. Location may not correspond precisely with MP for entire wetland impact due to irregular wetland shapes.

³ Pipeline construction ROW varies in width from 125 ft in areas of potential bedrock; 100 ft in uplands; and 95 in wetlands (narrows to 75' through deer wintering areas as well as in some residential areas).

⁴ Pipeline operational width: 30 feet maintained as shrubs/saplings except for 10-foot wide strip maintained as herbaceous vegetation over pipe centerline.

⁵ Impacts associated with the ATWSs at MP 0.00 are included with ATWS impacts. Impacts associated with pipeline construction between the Terminal send-out and MP 0.00 are included with Terminal Site impacts.

⁶ Impact involves permanent wetland loss (Terminal Site only), all remaining project wetland impacts involve vegetation clearing or maintained vegetation conversion.

⁷ Resource Report 7 provides a detailed description of all soils types located within the 50' Permanent ROW.

Table 2. Vernal Pool Characteristics

Facility	VP	MP	NWI Type	Natural Origin	Max. Depth (ft)	Area (ft ²)	WFE ¹	WFT ²	SSE ³	BSSE ⁴	SVP ⁵	Notes
Pipeline	4	0.22	PFO	Natural Modified	1-3'	337			12		No	Naturalized skidder scrape.
	5	1.32	PFO	Natural	0-1'	1,169	1		7		No	
	8	1.81	PFO	Natural Modified	0-1'	24	1		1		No	Naturalized skidder scrape. 10'x16'
	9	1.99	PEM	Unnatural	1-3'	84			3		No	Blasted Rock Crevice
	10	2.16	PEM	Unnatural	3-5'	70		F	17		No	Naturalized rock quarry
	11	2.20	PEM/PUB	Unnatural	3-5'	2,128	30	C	131	5	No	Naturalized rock quarry
	12	2.20	PEM	Natural	1-3'	2,969			13		No	Adjacent to recent logging
	13	2.30	PEM	Unnatural	1-3'	122		F	11		No	Naturalized rock quarry
	14	2.48	PFO	Natural	0-1'	6,169	3	C	29		No	Indicators were found in adjacent skidder ruts, but not in the pool itself
	15	2.52	PFO	Unnatural	1-3'	2,496			14		No	Naturalized
	16	2.62	PSS	Natural		2,590	22		20		Yes	
	17	2.68	PFO	Natural	0-1'	4,807	1		1		No	
	18	2.69	PSS	Natural	1-3'	1,406		C	4		Yes	
	19	2.71	PFO	Unnatural	3-5'	61	2		>20		No	Naturalized rock quarry
	20	2.72	PFO	Unnatural	1-3'	218		C	22		No	Naturalized rock quarry
	21	2.73	PFO	Natural	0-1'	434			2		No	
	22	2.73	PUB	Unnatural	3-5'	950		C	>20		No	Naturalized rock quarry
	23	2.74	PEM	Natural	0-1'	2,470		F	6		No	

Table 2. Vernal Pool Characteristics

Facility	VP	MP	NWI Type	Natural Origin	Max. Depth (ft)	Area (ft2)	WFE ¹	WFT ²	SSE ³	BSSE ⁴	SVP ⁵	Notes
Naturalized rock quarry	24	2.77	PSS	Natural	0-1'	1,877			8		No	
	25	2.92	PFO	Unnatural	3-5'	823			46	2	No	
	26	2.92	PFO	Natural	0-1'	91			2		No	
	27	3.59	PFO	Natural	0-1'	236			2		No	
	28	4.00	PSS	Natural	1-3'	17,747	7		>20		Yes	
	29	5.27	PSS	Natural	1-3'	4,492		C	>160		Yes	
	30	6.69	PSS	Natural	0-1'	318			4		No	
	31	5.72	PSS	Natural	0-1'	602			16		No	Cryptic pool
	32	5.85	PSS	Natural	0-1'	358	1	F	15		No	
	33	6.07	PSS	Modified	0-1'	13,008	20	C	7		No	Cryptic. Many small pools.
	34	6.10	PSS	Natural	Modified	0-1'	377			1	No	Small pool adjacent to larger wetland.
	35	6.12	PSS	Natural	Modified	0-1'	5,002			2	No	
	36	6.48	PUB	Natural		1-3'	99	3	C	2	No	Small, round rock crevice. Pool revisited in 2009
	38	9.05	PFO	Natural		1-3'	325				No	
	40	10.55	PFO	Natural	Modified	0-1'	1,476				No	
41	10.77	PEM	Natural	Modified	0-1'	103		F		No	Wood frog egg masses hatched.	
101	11.28	PEM	Natural	Modified	1-3'	1,813				No	One large wood frog egg mass found	
42	11.52	PEM	Natural		1-3'	430	3			No		

Table 2. Vernal Pool Characteristics

Facility	VP	MP	NWI Type	Natural Origin	Max. Depth (ft)	Area (ft ²)	WFE ¹	WFT ²	SSE ³	BSSE ⁴	SVP ⁵	Notes
	44	11.93	PSS	Natural Modified	0-1'	263			5		No	Naturalized skidder scrape
	45	11.93	PSS	Natural	0-1'	701			5		No	
	46	11.93	PSS	Natural	1-3'	172			9		No	
	47	11.93	PSS	Natural Modified	0-1'	172			3		No	Naturalized skidder scrape.
	48	12.05	PEM	Unnatural	1-3'	88		C	5		No	
	49	12.20	PFO	Natural Modified	1-3'	330		F	>40		No	Naturalized shallow excavation/head of stream
	43	12.57	PFO	Natural	1-3'	1,206	5	F	1		No	Wood frog egg masses hatched.
	51	12.82	PFO	Unnatural	0-1'	286			7		No	
	52	12.86	PEM	Unnatural	0-1'	380		C	3		No	Naturalized skidder scrape.
	102	14.60	PFO	Natural	1-3'	1,476			1		No	
	53	17.75	PEM	Natural Modified	0-1'	192	10		4		No	
	54	18.62	PEM	Unnatural	0-1'	1,070					No	
	55	18.64	PEM	Unnatural	1-3'	5,033	6	F			No	No inlet or outlet.
	56	19.92	PEM	Natural Modified	0-1'	4,787	2		2		No	
	57	20.31	PFO	Natural Modified	0-1'	1,037		C	10		No	Route 1 is situated between pool and pipeline corridor.
	59	20.57	PFO	Natural Modified	0-1'	1,082	1		2		No	

Table 2. Vernal Pool Characteristics

Facility	VP	MP	NWI Type	Natural Origin	Max. Depth (ft)	Area (ft ²)	WFE ¹	WFT ²	SSE ³	BSSE ⁴	SVP ⁵	Notes
Additional Temporary Work Spaces												
Terminal Site	1	0	PUB	Unnatural	3-5'	1,077			15		No	Silty. Excavated detention pond intermittent stream along driveway.
	2	0	PFO	Natural	0-1'	82			1		No	
	3	0	PFO	Natural	1-3'	1,072	2		>50		Yes	Cryptic pool.
Unpaved Access Road	6	1.5	PFO	Natural Modified	3-5'	960	1		6		No	3-5 ft diameter pool adjacent to roadway.
	7	1.5	PSS	Natural Modified	3-5'	34,983		C	>20		Yes	Road may be causing elevated inundation.
	50	12.3	PEM	Natural Modified	1-3'	4,642		F	>20		No	Manmade- ponded along dirt drive due to elevated culvert
Mitigation Site	1	0	PFO/PSS	Natural	1-3'	4,195			20			Classic high quality pool
	2	0	PFO/PSS	Natural	>5'	8,600	1		>20			Deep Pool
	3	0	PFO/PSS	Natural Modified	1-3'		6		62			Old Skidder Scrape

Notes:

1 Number of wood frog egg masses.

2 Abundance of wood frog tadpoles: F= Few; C = Common; M = Many; - See Section 2.1 for details.

- 3 Number of spotted salamander egg masses.
- 4 Number of blue spotted salamander egg masses (potential) - Potential BSS egg masses were observed in two pools (VP11 and VP 25); however, no adults were observed that could be used to verify the identification or to determine the ploidy state.
- 5 Vernal pools highlighted in **BOLD** are located more than 250' from the current construction row, but have upland habitat (750' buffer) within the project area.

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Scientific Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
Pipeline	0.2	W-6	PFO4, R2	Y	P	N	Y	Y	N	Y	P	N	N	N	N	N
	0.37	W-9-B	PSS1,PFO4, PEM1, PUB, R2	P	P	Y	Y	Y	Y	Y	P	Y	Y	N	N	N
	0.44	W-9-C	PFO4													
	0.48	W-9-D	PFO4													
	0.60	W-9-E	PFO4													
	0.80	W-10-A	PEM1	N	Y	N	Y	Y	N	N	P	Y	Y	N	N	N
	0.83	W-10-B	PFO4													
	0.88	W-10-C	PFO4													
	0.92	W-10-D	PFO4													
	1.05	W-10-E	PFO4													
	1.16	W-10-F	PFO4													
	1.19	W-10-G	PFO4													
	1.23	W-10-H	PFO4													
	1.36	W-10-I	PFO4, PSS1													
	1.45	W-11	PSS1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	1.72	W-18	PFO1, PFO4, R2	Y	P	N	Y	P	N	N	P	Y	Y	Y	N	N
	2.10	W-19	PFO4	N	P	N	Y	Y	N	N	P	N	N	N	N	N
	2.24	W-20	PFO4	N	Y	N	Y	Y	Y	N	P	N	Y	Y	N	N
	2.34	W-220	PEM1	Y	Y	N	P	N	N	P	Y	N	N	N	N	N
	2.44	W-21	PEM1,	Y	Y	N	P	N	N	P	Y	N	N	N	N	N
	2.53	W-22	PFO4	N	Y	N	P	Y	N	N	P	N	N	N	N	N
	2.61	W-203	PSS1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	2.64	W-23	PEM1	N	Y	N	P	Y	N	N	Y	N	N	N	N	N
	3.20	W-24-A	PFO4	P	Y	N	Y	P	Y	Y	P	N	Y	Y	N	N

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Scientific Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
Pipeline	3.36	W-24-C	PFO4													
	3.43	W-24-D	PSS1, PFO1													
	3.69	W-24-E	PFO4													
	4.14	W-25	PFO4	N	P	N	N	N	N	N	Y	N	N	N	N	N
	4.64	W-26	PFO1, PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	4.95	W-27	PFO4	N	P	N	Y	N	N	N	Y	N	N	N	N	N
	5.04	W-28-A	PFO4	N	Y	N	Y	N	N	N	P	N	N	N	N	N
	5.07	W-28-B	PFO4													
	5.08	W-28-C	PFO4													
	5.74	W-30	PFO1	N	Y	N	Y	Y	N	N	P	N	Y	Y	Y	N
Pipeline	5.87	W-204	PSS1a	Y	N	N	Y	P	N	N	P	N	Y	Y	Y	N
	6.09	W-32	PSS1	N	Y	N	P	Y	N	N	Y	N	Y	N	N	N
	6.36	W-33-A	PSS1, R2, PFO4	Y	Y	N	N	N	N	Y	P	N	N	N	N	N
	6.39	W-34	PFO4	N	P	N	Y	N	Y	N	P	N	Y	N	N	N
	6.52	W-35	PSS1	N	P	N	P	Y	N	N	N	N	N	N	N	N
	6.55	W-36	PFO4	N	P	N	Y	N	N	N	Y	N	N	N	N	N
	6.82	W-38	PSS1, Ditch	N	P	N	P	Y	N	N	N	N	N	N	N	N
	6.86	W-205	PEM1	N	Y	N	P	Y	N	N	N	N	N	N	N	N
	6.96	W-41	PEM1	N	Y	N	P	Y	N	N	N	N	N	N	N	N
	7.02	W-44	PEM1	N	P	N	P	Y	N	N	N	N	N	N	N	N
	7.00	W-45	PEM1, PSS1	Y	Y	N	P	P	Y	Y	P	N	N	N	N	N
	7.08	W-55	PEM1	Y	Y	N	P	Y	N	N	N	N	N	N	N	N
	8.69	W-77	PFO1, PFO4	N	P	N	P	Y	N	N	Y	N	N	N	N	N
	8.73	Stream-5	Ditch	Y	Y	Y	N	N	N	P	Y	N	N	N	N	N
	8.93	W-78	PFO1	N	P	N	Y	Y	N	N	N	N	N	N	N	N

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Scientific Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
Pipeline	8.95	W-80	PFO1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	9.05	W-81	PFO1	N	P	N	Y	Y	N	N	Y	N	N	N	N	N
	9.20	W-83	PFO1, R2	Y	P	N	P	Y	N	Y	Y	N	N	N	N	N
	9.26	W-86	PFO1	Y	N	N	P	Y	N	N	N	N	N	N	N	N
	9.32	W-88	PFO1	Y	P	N	P	Y	N	Y	N	N	N	N	N	N
	9.38	W-89-A	PFO1	Y	P	N	P	Y	N	P	Y	N	N	Y	N	N
	9.46	W-89-B	PFO1, R2													
	9.64	W-89-C	PSS1													
	9.64	W-89-D	PFO1	Y	P	N	P	Y	N	P	Y	N	N	Y	N	N
	9.77	W-90-B	PSS1	P	Y	N	Y	Y	N	N	P	N	N	N	N	N
	9.79	W-91-A	PSS1	N	Y	N	P	Y	N	N	Y	N	N	N	N	N
	9.83	W-91-B	PFO1													
	9.98	W-301	PFO4	N	Y	N	P	P	Y	N	N	N	N	N	N	N
	10.01	W-302	PFO1	Y	P	Y	P	Y	N	N	Y	N	N	Y	N	N
	10.02	W-303	PFO4	N	Y	N	P	P	Y	N	N	N	N	N	N	N
	10.14	W-93	PFO4, PFO1, R2	Y	N	N	P	Y	N	P	P	N	N	N	N	N
	10.24	W-94	PSS1, PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	10.40	W-95	PFO4	Y	N	N	Y	P	N	P	P	N	N	N	N	N
	10.55	W-96	PFO4	N	Y	N	P	Y	N	N	Y	N	N	N	N	N
	10.62	W-97	PSS1	N	P	N	N	N	N	N	N	N	N	N	N	N
	10.68	W-98	PSS1	Y	Y	Y	N	N	Y	P	Y	N	N	N	N	N
	10.82	W-99	PSS1	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	11.00	W-100	PEM1, PFO1, PSS1	Y	P	Y	P	P	N	Y	P	Y	P	Y	Y	N
	11.31	W-100-A	PSS1, PFO4	Y	P	Y	P	P	N	Y	P	Y	P	Y	Y	N
	11.45	W-102	PSS1, PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
Pipeline	11.50	W-103	PSS1	N	P	N	N	N	N	N	N	N	N	N	N	N
	11.55	W-104	PFO4, PSS1, R2	Y	P	Y	N	N	Y	P	P	N	N	N	N	N
	11.67	W-107	PEM1	N	P	N	P	Y	N	N	N	N	N	N	N	N
	11.70	W-109-A	PEM1, PFO4, PSS1	N	P	N	Y	Y	N	N	P	N	N	N	N	N
	11.80	W-109-B	PEM1, PFO4													
	11.92	W-117-A	PEM1, PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	12.07	W-117-B	PEM1, PFO4													
	12.24	W-118-A	PEM1, PFO1	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	12.36	W-118-B	PEM1, PFO4													
	12.50	W-118-C	PEM1													
	12.75	W-122-A	PEM1, PFO4, PFO1	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	12.89	W-122-B	PEM1, PFO4													
	13.15	W-125	PSS1	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	13.35	W-126	PEM1	N	P	N	P	Y	N	N	N	N	N	N	N	N
	13.93	W-127	PFO4, PSS1	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	14.28	W-128-A	PEM1, R2	P	N	N	Y	Y	N	N	N	N	N	N	N	N
	14.31	W-128-B	PEM1													
	14.47	W-129-A	PEM1, PFO4	Y	Y	P	Y	Y	Y	P	P	Y	N	N	N	N
	14.52	W-129-C	R2													
	14.55	W-129-E	PFO4													
	14.85	W-130-A	PEM1, PFO4	N	Y	N	P	Y	N	N	Y	N	N	N	N	N
	14.88	W-130-B	PEM1, PFO4													
	15.01	W-131-A	PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
		W-132	PEM1	N	P	N	Y	Y	N	N	N	N	N	N	N	N

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Scientific Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
Pipeline	15.09	W-133-A	PEM1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	15.12	W-131-B	PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
		W-133-B	PEM1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	15.15	W-134	PEM1	N	P	N	Y	P	N	N	P	N	N	N	N	N
	15.17	W-131-C	PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	15.18	W-135	PEM1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	15.36	W-131-E	PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	15.31	W-136	PSS1	N	Y	N	P	P	N	N	N	Y	N	N	N	N
	15.36	W-137-A	PSS1, PEM1	N	Y	N	P	P	Y	N	N	N	N	N	N	N
	15.42	W-137-B	PFO4													
	15.46	W-138	PSS1	N	P	N	N	N	N	N	N	N	N	N	N	N
	15.70	W-139-A	PFO4, PSS1, PEM1, R2	P	P	N	Y	Y	Y	Y	P	N	Y	N	Y	N
	16.01	W-141	PEM1, PFO4	N	P	N	N	N	N	N	N	N	N	N	N	N
	16.30	W-142	PFO4, PSS1	N	P	N	N	N	N	N	Y	N	N	N	N	N
	16.44	W-143	PFO4	N	P	N	N	N	N	N	Y	N	N	N	N	N
	16.65	W-144	PFO4, PSS1	N	P	N	Y	Y	Y	N	Y	Y	Y	N	N	N
	16.95	W-145	PFO4	N	Y	N	N	Y	Y	N	P	Y	N	N	N	N
Pipeline	17.62	W-148-A	PFO4, PSS1	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	17.80	W-149-B	PFO4	N	Y	N	Y	Y	N	N	P	N	N	N	N	N
	18.17	W-151	PFO4	N	P	N	N	N	N	N	Y	N	N	N	N	N
	18.34	W-152	PFO1, PSS1, R2	Y	P	P	Y	Y	Y	P	P	Y	Y	N	N	N
	18.47	W-153	PFO4	N	P	N	N	N	N	N	N	N	N	N	N	N
	18.55	W-154	PFO4, PSS1	Y	Y	N	Y	Y	N	N	P	N	N	N	N	N
	18.65	W-156	PEM1	Y	P	N	N	N	N	N	N	Y	N	N	N	N
	18.74	W-160	PFO4, PSS1	N	Y	N	Y	Y	Y	N	P	N	N	N	N	N

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Scientific Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
	18.89	W-162-A	PSS1	N	Y	N	P	P	Y	N	Y	N	N	N	N	N
	19.10	W-162-C	PEM1, PFO4													
	19.22	W-162-D	PEM1, PFO4													
	19.31	W-163-A	PEM1, PFO4	N	Y	N	P	P	Y	N	N	N	N	N	N	N
	19.40	W-163-B	PFO4		Y											
	19.47	W-163-C	PEM1, PFO4													
	19.52	W-163-D	PEM1, PFO4													
	19.82	W-164	PFO4	N	P	N	Y	Y	N	N	Y	N	N	N	N	N
	19.83	W-165	PFO4	N	P	N	N	N	N	N	N	N	N	N	N	N
	20.09	W-166	PEM1, PFO4	N	Y	N	P	Y	Y	N	N	N	N	N	N	N
	20.20	W-167	PEM1, PFO4	N	Y	N	P	Y	Y	N	Y	N	N	N	N	N
	20.27	W-168-A	PFO4	N	Y	N	P	Y	Y	N	Y	N	N	N	N	N
	20.35	W-168-B	PEM1, PFO4													
	20.57	W-169	PEM1, PFO4	N	Y	N	P	Y	N	N	Y	N	N	N	N	N
	20.60	W-217	PEM1	Y	Y	N	P	N	N	N	Y	N	N	N	N	N
	20.61	W-218	PSS1	Y	Y	N	P	N	N	N	P	N	N	N	N	N

Table 3 : Wetland Functions and Values

Facility	MP	Wetland ¹	NWI Classification ²	Groundwater Recharge/ Discharge	Floodflow Alteration	Fish/Shellfish Habitat	Sediment/ Toxicant Removal	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics	Endangered Species Habitat
ATWS	0.01	W-202	PSS1	N	P	N	P	Y	N	N	N	N	N	N	N	N
	0.37	W-9-B	PFO4	P	P	Y	Y	Y	Y	Y	P	Y	Y	N	N	N
	1.45	W-11	PSS1	N	P	N	Y	Y	N	N	N	N	N	N	N	N
	6.86	W-205	PEM1	N	Y	N	P	Y	N	N	N	N	N	N	N	N
	7.00	W-45	PSS1	Y	Y	N	P	P	Y	Y	P	N	N	N	N	N
	9.20	W-83	PFO1	Y	P	N	P	Y	N	Y	Y	N	N	N	N	N
	9.26	W-86	PFO1	Y	N	N	P	Y	N	N	N	N	N	N	N	N
	10.14	W-93	PFO4	Y	N	N	P	Y	N	P	P	N	N	N	N	N
	10.4	W-95	PFO4	Y	N	N	Y	P	N	P	P	N	N	N	N	N
	14.47	W-129-A	PEM1	Y	Y	P	Y	Y	Y	P	P	Y	N	N	N	N
	14.47	W-216	PFO4, PSS1	Y	P	N	Y	Y	N	Y	P	N	N	N	N	N
	15.31	W-136	PSS1	N	Y	N	P	P	N	N	N	Y	N	N	N	N
	15.36	W-137A	PSS1, PEM1	N	Y	N	P	P	Y	N	N	N	N	N	N	N
	15.7	W-139-A	PFO4	P	P	N	Y	Y	Y	Y	P	N	Y	N	Y	N
	6.88	W-39	PEM1	N	P	N	P	Y	N	N	N	N	N	N	N	N
Contractor Yard	6.95	W-43	PEM1	N	P	N	Y	Y	Y	N	Y	N	N	N	N	N
	7.06	W-56	PSS1	N	Y	N	Y	Y	Y	N	P	N	N	N	N	N
	7.07	W-52	PEM1	Y	Y	N	P	Y	N	N	N	N	N	N	N	N
	7.08	W-55	PEM1	Y	Y	N	P	Y	N	N	N	N	N	N	N	N
	N/A	W-180	PFO4, PEM1	Y	P	N	Y	Y	N	N	Y	N	N	N	N	N
HDD	7.08	W-55	PEM1	Y	Y	N	P	Y	N	N	N	N	N	N	N	N
	8.57	W-76	PFO1	N	P	N	Y	N	N	N	Y	N	N	N	N	N
Terminal	0	W-1-A	PEM1, PFO4, PSS1, PUB, R2	Y	P	N	Y	Y	N	P	Y	N	N	N	N	N
	0	W-2	PFO4	N	Y	N	P	Y	N	N	N	N	N	N	N	N
	0	W-3A	PSS1	Y	Y	N	Y	Y	N	N	P	N	N	N	N	N
	0	Stream-1	R2	N	N	N	N	N	N	N	P	N	N	N	N	N

Table 4: Important Wetland Systems

Facility	MP	Wetland	Comments
Pipeline	0.37	W-9-B	Large beaver pond, headwaters of unnamed tributary to St. Croix River
Pipeline	1.72	W-18	Large wetland closely associated with Carson Heath
Pipeline	3.36	W-24-C	Contributing wetland to Vose Pond and Magurrewoc Stream in MNWR; beaver flowage
Pipeline	5.27	VP-29	Significant Vernal Pool
Pipeline	5.82	W-31	Peatland- leatherleaf bog
Pipeline	7.00	W-45	Coincides with Significant Wildlife Habitat - IWWH; Within St. Croix 100 yr floodplain; borders Magurrewoc Marsh/MNWR; multiple habitat types
Pipeline	7.20	W-59	Coincides with Significant Wildlife Habitat - IWWH; within Magurrewoc Stream/ St. Croix floodplain; large emergent marsh/riverine habitat
Pipeline	7.80	W-61	Part of St. Croix River; coincides with Significant Wildlife Habitat - IWWH
Pipeline	9.48	W-89	Part of St. Croix River active floodplain
Pipeline	9.81	W-91	Coincides with potential Significant Wildlife Habitat - DWA; Within 100-year floodplain of St. Croix
Pipeline	10.03	W-92	Includes Conic Stream, potential Significant Wildlife Habitat - DWA; Within 100-year floodplain of St. Croix River
Pipeline	10.14	W-93	Includes Conic Stream, potential Significant Wildlife Habitat - DWA; Within 100-year floodplain of St. Croix River
Pipeline	11.00	W-100	Within active floodplain of St. Croix River, large marsh complex, multiple habitat types
Pipeline	11.55	W-104	Stony Brook floodplain
Pipeline	14.47	W-129	Wapsaconhagan Brook floodplain
Pipeline	15.70	W-139	Marsh complex, Wapsaconhagan Brook tributary, multiple habitat types
Pipeline	18.34	W-152	Anderson Brook floodplain. Significant Wildlife Habitat - IWWH; edge of large wetland complex